Union Iron Works Turbine Machine Shop
2200 Webster Street
Alameda
Alameda County
California

HAER No. CA-43

HAER
CAL,
1-ALAM,
2-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

Historic American Engineering Record
Western Region
National Park Service
Department of the Interior
San Francisco, California 94102

HAER
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HISTORIC AMERICAN ENGINEERING RECORD

Union Iron Works Turbine Machine Shop

HAER No. CA-43

Location: 2220 Webster Street (approximately 500 feet east of Webster Street and 1000 feet south of the southernmost boundary of the U. S. Pierhead and Bulkhead line for the Oakland Inner Harbor [estuary])
City of Alameda, Alameda County, California

Quad: Oakland West

Date of Construction: 1917

Present Owner: Alameda Marina Center Associates
3000 Sand Hill Road, Building 3, Suite 255
Menlo Park, California 94025

Present Use: Vacant

Significance: The Union Iron Works Turbine Machine Shop building is both historically and architecturally significant. As the nucleus of a major West Cost shipyard which made important contributions to ship building in both world wars, the large structure was first utilized (World War I) for production of reciprocating engines, diesel engines and marine turbines and, subsequently (during the Depression and World War II), for fabricating structural steel for a number of important buildings and structures on the West Coast and in parts of ship building. The building, the only known major industrial design by the locally prominent architect, John Reid, Jr., is an impressive example of a large, open-plan industrial structure with vast interior spaces made possible by the use of steel trusses and steel frame construction and by curtain walls that lighted and ventilated the huge spaces. Its architectural quality is derived from its simplicity of structure, massing and detail; its curtain walls; and its straightforward response to its function

Historians: Michael Corbett and Margaret Welden
Charles Hall Page and Associates
September 1979

Transmitted by: Jean P. Yearby, HAER, 1985

The Union Iron Works Turbine Machine Shop is a large rectangular industrial building, of steel frame construction with curtain walls of red brick and industrial sash.

Measuring 552 feet by 164 feet and standing 85 feet high, the building is 23 bays long by 7 bays wide. It sites on a forest of concrete pile caps. Its roof is flat, except fora large monitor skylight crossed by 12 auxiliary skylights which run the length of the building. The main building is flanked by two buttress-like utility towers on both the north and south elevations. The dominant visual features of the buildings are the red color of its back piers and spandrels and the vast windows that occupy 90% of its wall area.

Both the narrow end walls and the long, buttressed, side walls of the building are articulated snd organized by a series of major and minor piers. The seven bays of the end walls are grouped by major piers in pairs of bays. This central pavilion projects above the rest of the building to hide the monitor roof. Major piers set off the end bays of the longer side walls. The piers of all elevations are crossed by two spandrel divisions that suggest a three-story interior space. In fact, the lower and more prominent spandrel corresponds to an interior mezzanine level along the aisles, but the narrow, higher spandrel merely reflects a major beam and does not correspond to a second upper level. The central pavilion reflects the major, central, unbroken space.

Ornamental brickwork on all main elevations is relegated to the lower spandrel panels, to the piers, and to the cornice. Spandrel panels are criss-crossed with raised brickwork, forming a diamond pattern; piers are treated with abstracted capitals; and the cornice is little more than a patterned frieze. The utility towers, which are the only part of the building with a predominance of brick over glass, have all of these elements plus herringbone patterned brick panels.

Inside, unclad steel columns divide the area into three sections, a vast central area open from floor to floor, flanked by two aisles divided vertically by mezzanine floors. The heavy but uncomplicated steel framing of the walls, aisles, and mezzanine floors gives way to a simple truss sytem that carries the flat roofs and to a more complicated system of light steel trusses that carry the monitor roof, with all its bays, over the unbroken central space. The combination of exposed steel framing, light trusses, vast areas of glass, and the bays of the monitor produce an animated and exciting interior space.

The ground floor, once covered with creosoted redwood blocks, is a concrete slab surface. The mezzanine floor and roof areas were planed and surfaced. The utility towers housed elevators, stairs, and small rooms which originally functioned as offices, locker rooms, and quiet places somewhat apart from the noise of the shop itself.

Although designed for the production of machine turbines, the layout of the building was sufficiently flexible to accommodate changing methods in their manufacture as well as in the manufacture of other heavy industrial products. The only permanent determinants of any manufacturing process in the building, apart from the building itself, were a giant crane spanning the central space above the mezzanine level that was designed to run the length of the building on tracks; railroad tracks that entered the east, west, and north side of the building; and cantilevered loading balconies at each bay of the mezzanine. The crane is still in place. The railroad tracks, that were linked to the Southern Pacific lines at the western edge of the property and that were also used for transporting heavy materials around the plant, have been taken up.

The building itself is unaltered except for the replacement of old steel doors for new ones at the ground level, and for the destruction by vandalism of large numbers of panes of glass.

Most of the other buildings which contributed to the shipbuilding and industrial activities on the site were razed decades ago. Formerly the most prominent member of this industrial complex, the Union Iron Works Turbine Machine Shop has had its visual and functional relationships to such complex almost completely changed as a result.

The Union Iron Works Turbine Machine Shop is architecturally one of the most impressive examples in the San Francisco Bay Area of an early 20th century industrial building. At the time of its construction, it was the largest of its kind on the Pacific Coast. It is the most prominent example of industrial architecture by the important San Francisco architect, John Reid, Jr., a man who is best known for his contributions to the San Francisco Civic Center and as a designer of San Francisco school buildings. The building was also important as the nucleus of a shipyard that played nationally recognized roles in shipbuilding in both World Wars, and that was important in the industrial development of the Alameda estuary and the city of Alameda. It was the largest and most prominent building in the shipyard.

The turbine machine shop is an excellent example of a type of industrial building found in major industrial centers throughout the United States in the early 20th century, including buildings for Bethlehem Steel at Sparrow's Point, Maryland, and Elizabeth, New Jersey. The type is characterized by vast interior spaces made possible by the use of steel trusses and steel frame construction, and by curtain walls of industrial sash that light and ventilate the huge spaces. These buildings are open in plan and thus sufficiently flexible to accommodate changing industrial processes. Such big American industrial structures were major influences on early modern architects in the United States and Europe. Due to its size and its prominent location near the Alameda estuary, the turbine machine shop is widely known today and still admired for the same qualities that appealed to early modernists: its simplicity of structure, massing, and detail; its straightforward response to its function; and its vast curtain walls of industrial sash. Although there

are other buildings of a similar type and age in the Bay Area, few were as handsome as this.

The architect, John Reid, Jr., was one of the leading architects in San Francisco in the 1910s and 1920s. He studied at the Ecole des Beaux Arts in Pris from 1906 to 1909 and received his diploma in 1909. He was one of three architectural advisors in the planning and building of the San Francisco Civic Center. Later, he became San Francisco City Architect and built a great many schools in that capacity. Most of his work was in San Francisco. Although it is the only known industrial structure designed by him, the turbine machine building reflects the orderly design of all his work, suitable in its plan and appearance to its function. Mr. Reid was assisted in the design by the firm of Hall and Snyder, Engineers, and the structural plans were prepared under the supervision of Mr. C. H. Snyder of that firm.

The history of the turbine machine shop is inseparable from that of the shipyard around it. The shipyard was located on land which had long been known as the Alameda Marsh. By about 1900, Alaska sailing vessels moored there during the winter and, before 1902, Dickie Brothers of San Francisco built a slip for the construction of small wooden ships. In 1903, the United Engineering Company of San Francisco bought the property, improved it and, by 1916, built up an extensive business in repairing and drydocking steam schooners and other ships. This was the first important industry on the Alameda side of the estuary and one of the first at the western end of Alameda, areas that during the World War I would become central to the industrial economy of the whole East Bay.

In 1916, the yard was bought by Union Iron Works, a manufacturer of mining machinery, locomotives, and ships, which already operated the Potrero Works, Risdon Works, and Hunters Point Works in San Francisco. The Alameda Yard was known as the Alameda Works of Union Iron Works. In 1906, Union Iron Works had been bought by the Bethlehem Steel Corporation. In 1917, in response to the World War, Bethlehem Steel set up the Bethlehem Shipbuilding Corporation, Ltd., a consolidation of several shipyards throughout the United States. The three works of Union Iron Works became known as the Union Plant of the Bethlehem Shipbuilding Corporation. A major expansion of the shipbuilding facilities of the Alameda Works took place at that time, including construction of six ways for the assembling of ships up to 550 feet long; the 500-foot plate shop; the marine building for warehousing and the construction of small parts; the power house; an employee cafeteria; several office buildings; an employee hospital, and the turbine machine shop for the production of reciprocating engines, diesel engines, and marine turbines. The complex was entered through a formal entrance gate at Tynan Avenue. Altogether, the Alameda Works "spread over seventy acres and was considered one of the largest and best equipped yards in the country."[1] The turbine machine shop itself was referred to as "the finest machine shop on the Pacific Coast."[2]

During World War I, several accomplishments of the yard attracted widespread public acclaim and official acknowledgement. In 1919, the company newsletter stated, "Figured on a basis of tons per slip per man, the Alameda plant leads all other plans in the United States for the year 1918."[3] This record included construction of the two largest ships ever built on the Pacific Cost up to that time, the launching of the 12,000 ton freighter "Invincible" after only 24 working days, and the launching of four 12,000 ton freighters on July 4, 1918. The latter event was one of the important rallying points of the war years for Alameda citizens: "The Bethlehem yards were gay with flags and streamers for the quadruple launching, and thousands of spectators crowded every available vantage point to witness the spectacle."[4] These speed records were due in large part to the assembly and riveting on the ground of major sections of ships, which were then hoisted into place. All in all, between 1916 and 1923, a total of 58 ships were built.

After 1923, the Alameda Works ceased making ships but continued its drydocking and ship repairing operations. In 1933, the turbine machine shop was renamed the Alameda Fabricating Works and was revamped "for the sole function of fabricating structural steel."[5] It maintained this function through World War II years, producing steel for the Alameda County Court House, the San Francisco Mint, and many Army and Navy buildings on the Pacific Coast, among others. It also continued to produce parts for the revitalized shipyard at the Alameda Works during World War II.

At the beginning of World War II, the Alameda Works was reestablished as the Bethlehem Alameda Shipyard, Inc., which was sold to the United States Maritime Commission and leased back to Bethlehem. The yard was modernized and expanded. Among the most prominent of the new structures were a five-story reinforced-concrete warehouse; new ways; and new housing that was built south of the yard. During the war, the yard repaired over 1,000 vessels, and it produced P-2 troop transport ships, "the largest non-combatant vessel to be built by any American shipyard since Pearl Harbor."[6] A contract for 10 of these 23,000-ton ships called for them to be convertible to luxury liners after the war.

After World War II, ownership of the Alameda Works reverted back to the Bethlehem Steel Corporation, although there remained some confusion in the title for many years. Shipbuilding came to an end and, by the early 1950s, the old Alameda yard was used principally to maintain and repair equipment used by other Bay Area facilities of Bethlehem Steel.

Following its closure by 1956, and the demolition of many of its buildings, the old Alameda Works was owned by a series of different companies, none of whom used the works to its capacity. Most buildings on the property were torn down, but the turbine machine shop was not significantly altered. During these years, it was used to sell heavy machinery and for a marine salvage business. Since 1972, the building has been vacant.

The building was proposed for retention in a Master Plan approved by the city of Alameda in 1979. The owners of the building subsequently performed lengthy and detailed analyses of the structural characteristics and code requirements for the building. In 1983, its owners developed an economically-feasible program for adaptive reuse of the building, consistent with the prior approval: a mixed-use facility with shopping, parking, recreation, and multiple-dwelling residential use was proposed. Such residential use was, however, precluded by provisions of a 1973 amendment to the City Charter of Alameda. A citizens committee, Alamedans to Save the Red Brick Building, was formed in January 1984 to retain the building. The committee qualified a ballot measure to exempt the structure from the restrictions on residential use, but the ballot measure was defeated by a majority of the voters (56%) in June 1984. No other economic rehabilitation of the structure has been presented to or by its owners, and retention is not possible or appropriate under such circumstances.

FOOTNOTES

1 Merritt, Frank Clinton, History of Alameda County, California. Chicago and S. J. Clarke Publishing Company, 1928, Vol. I, page 408.

2 Bethlehem Shipbuilding Corporation, Ltd., 1919 (?), p. 104.

3 "Records Within Records" Make for Speed at Alameda Plant, Bethlehem Star, Vols. 1 and 5, April 1919.

4 Merritt, p. 411.

5 Bethlehem Pacific Coast Steel Corporation, Bethlehem Pacific Steel Facilities, 1948, n.p.

6 Western Shipbuilders in World War II: A Detailed Review of Wartime Activities of Leading Maritime and Navy Contractors. Oakland Shipbuilding Review Publishing Association, 1945, n.p.

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1. Alameda County Building Permits

2. Bethlehem Pacific Coast Steel Corporation. Bethlehem Pacific Steel Facilities. 1948.

3. Bethlehem Shipbuilding Corporation, Ltd., (Union Plant), "Union Plant History Shows Marvelous Development," II:I (June 1918) 3.

4. Bethlehem Shipbuilding Corporation, Ltd. 1919 (?).

5. Christy, Robert E. The United Engineering Works and the United Engineering Company: A Brief History of Two Alameda Shipyards. 1959.

6. Hansen, P. R. The History of Bethlehem Steel Alameda Shipyards. 1959.

7. Merritt, Frank Clinton. History of Alameda County, California. Chicago and S. J. Clarke Publishing Company, 1928, Vol. I.

8. Morrow, Irving F., "Work by John Reid, Jr., A.I.A.," The Architect and Engineer, LX:2 (February 1920) 43-47.

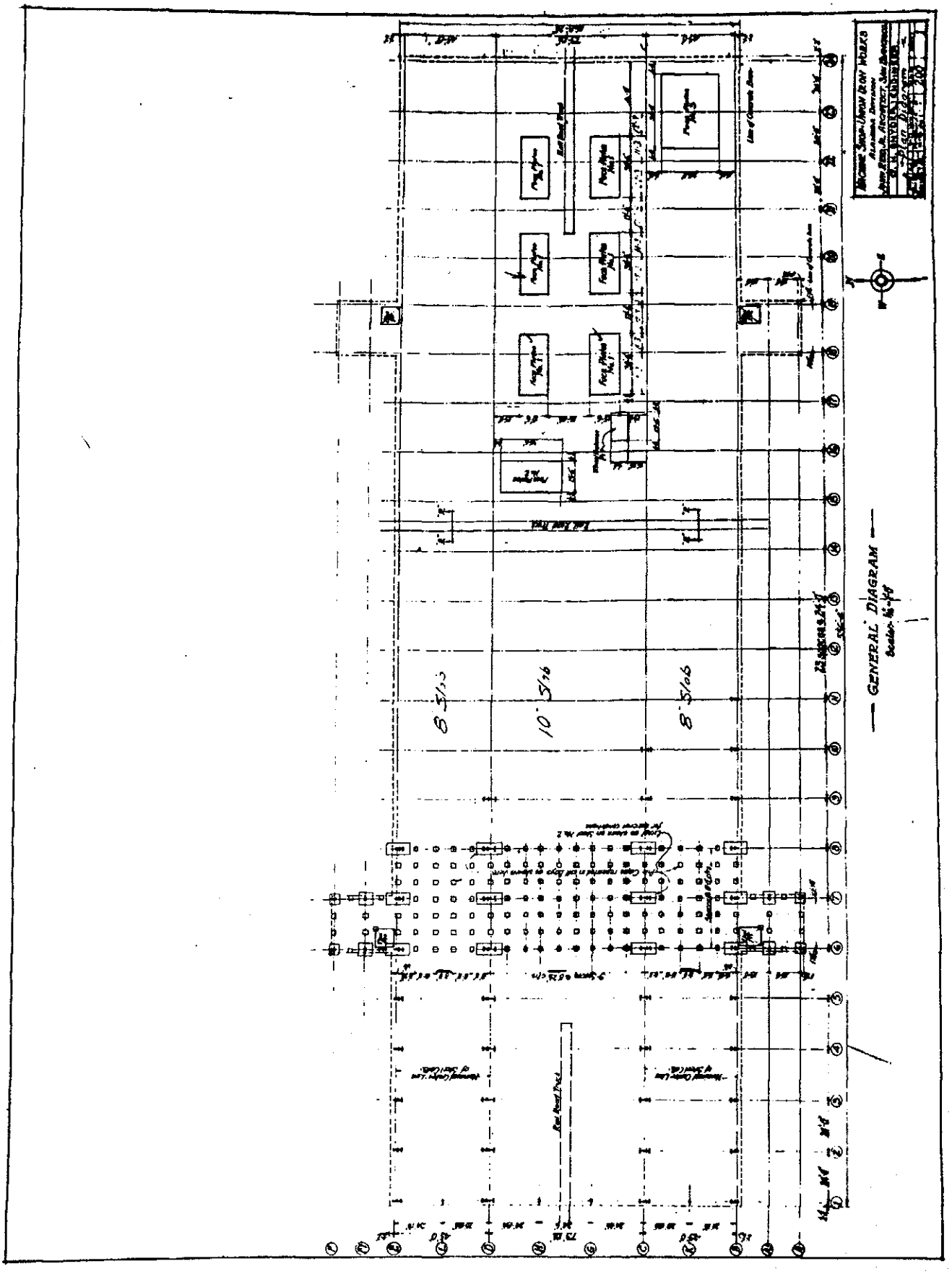
9. "Records Within Records" Make for Speed at Alameda Plant, Bethlehem Star, Vols. 1 and 5, April 1919.

10. Rudd Cast & Associates, Inc. Bethlehem Steel Shop Building. 1977.

11. Schwab, Charles M. "Pacific Coast Shipbuilders Lead the Nation," Architect and Engineer LIV:1 (July 1918) 39-43.

12. Western Shipbuilders in World War II: A Detailed Review of Wartime Activities of Leading Maritime & Navy Contractors. Oakland Shipbuilding Review Publishing Association. 1945.

13. "With the Architects," The Architect and Engineer. XLVI:1 (July 1916) 134 nd LI:1 (October 1917) 108.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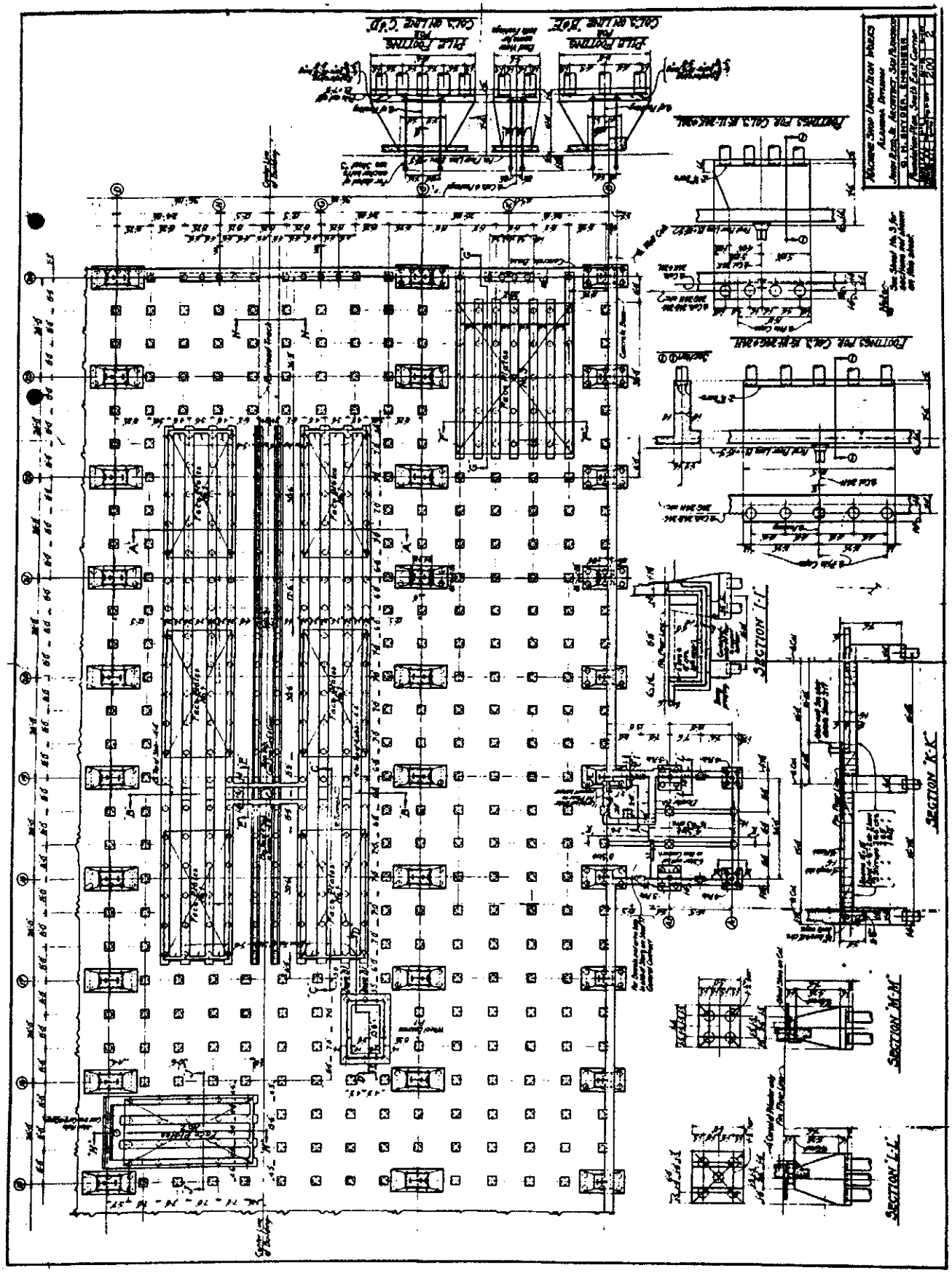
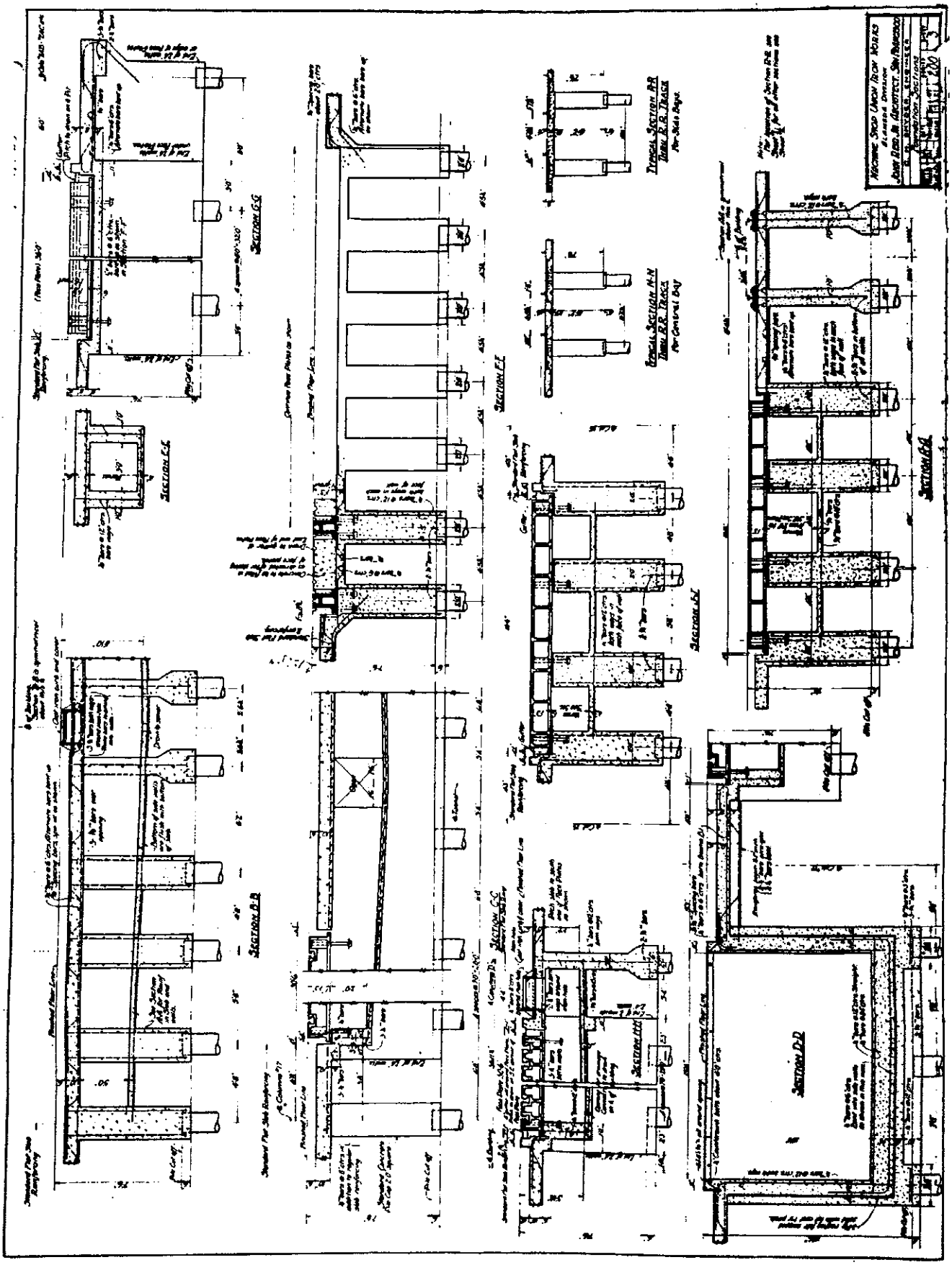
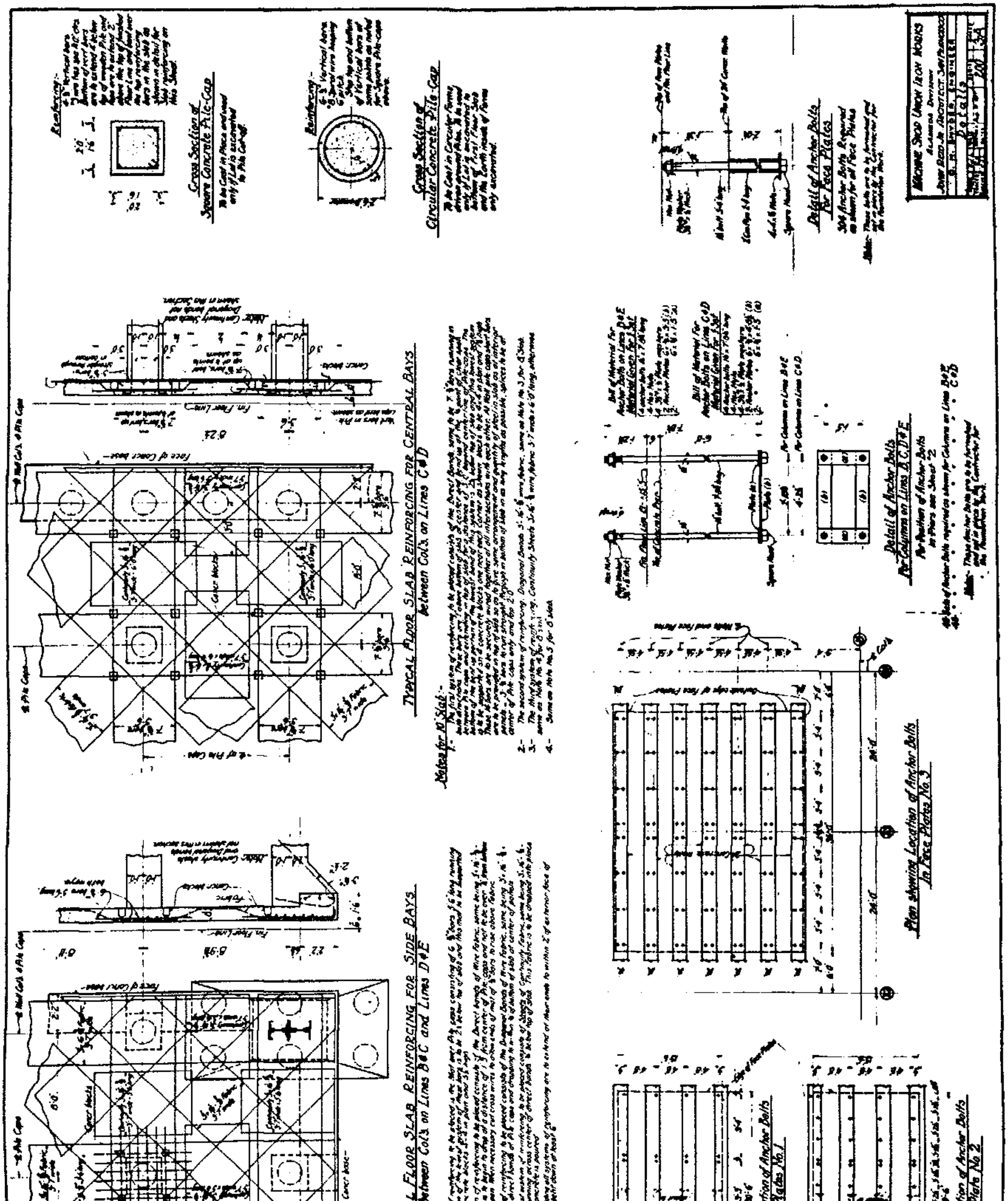
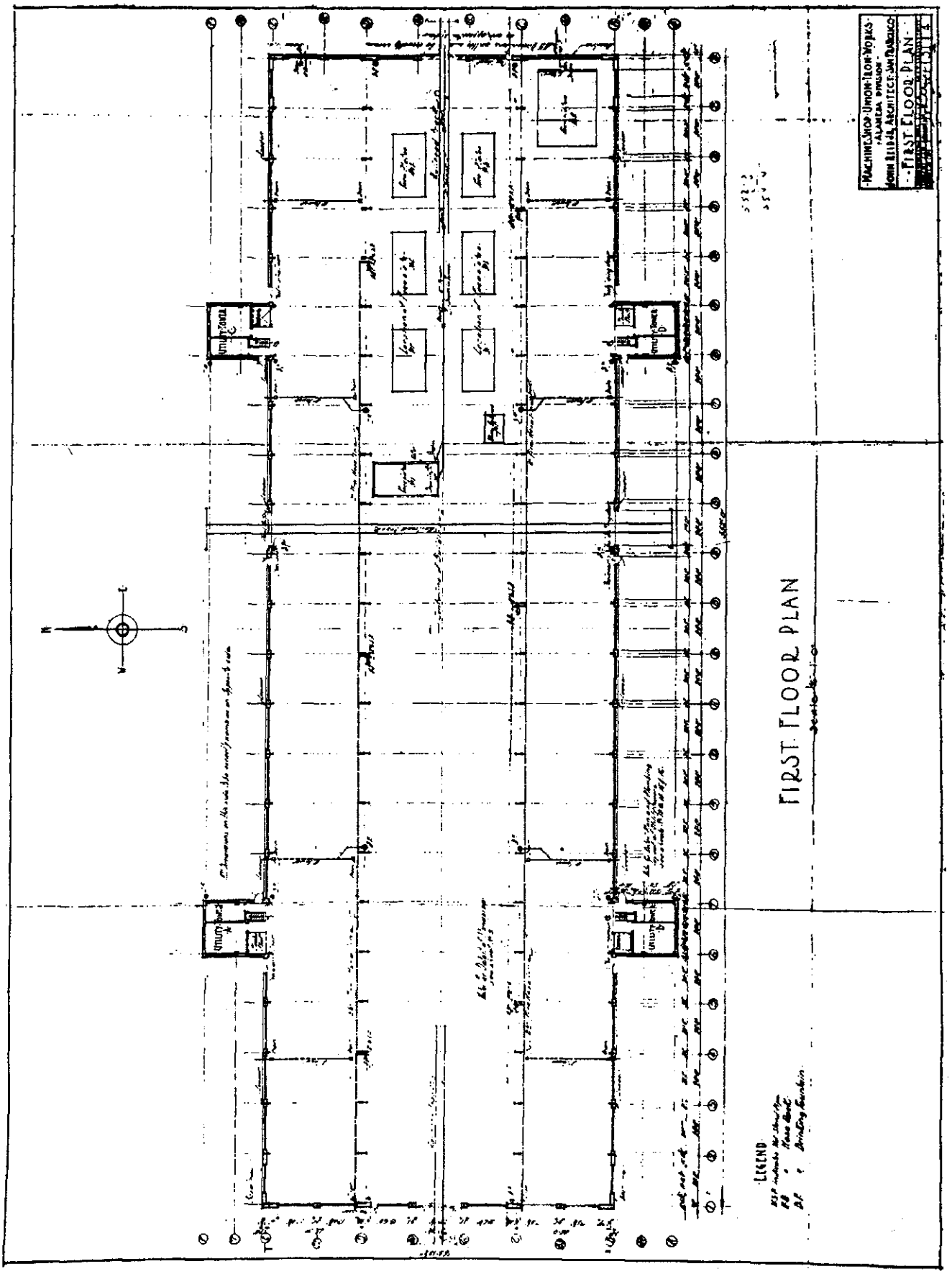
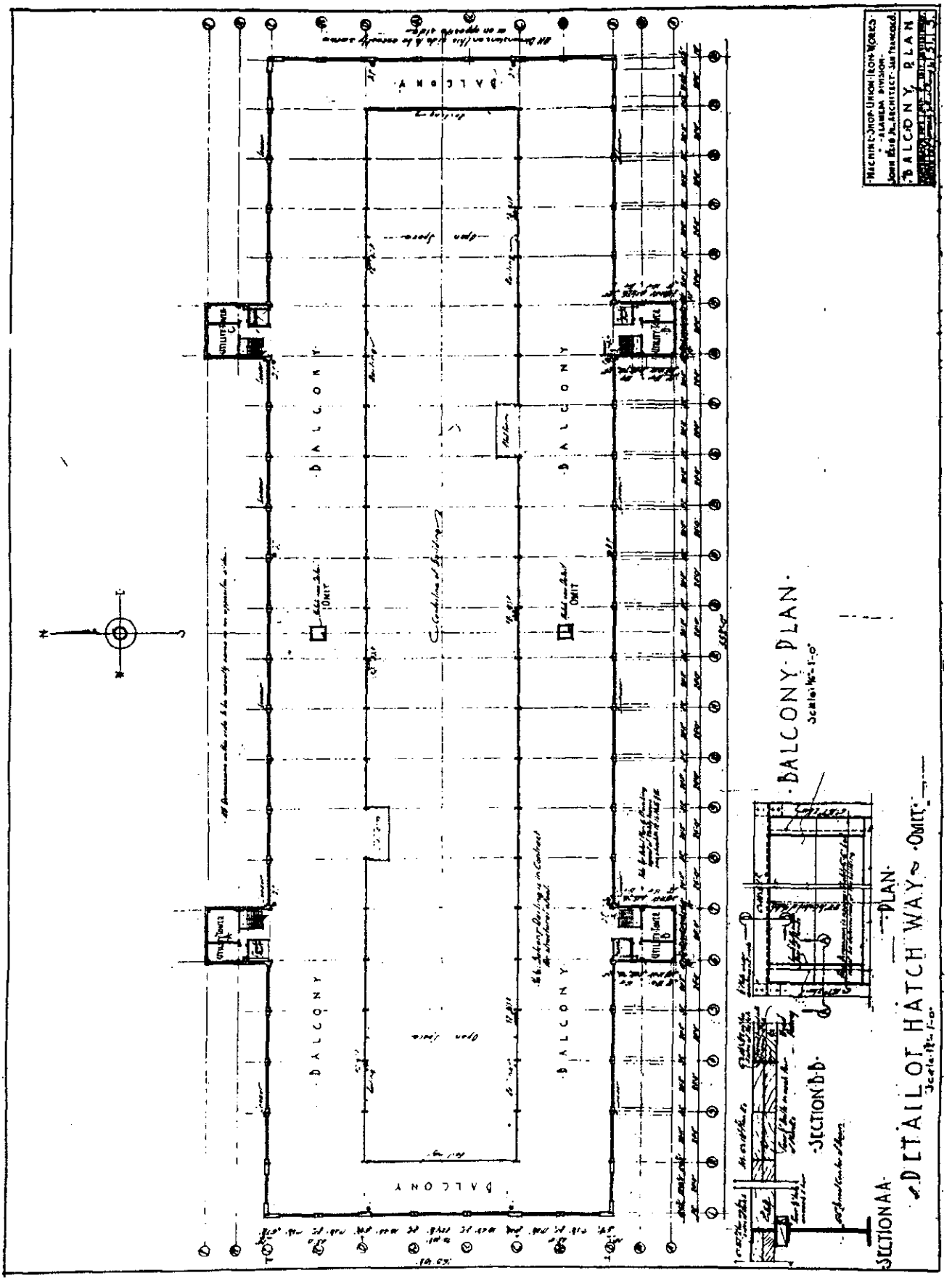
8'-5 1/2"
10'-5 1/16"
8'-5 1/16"

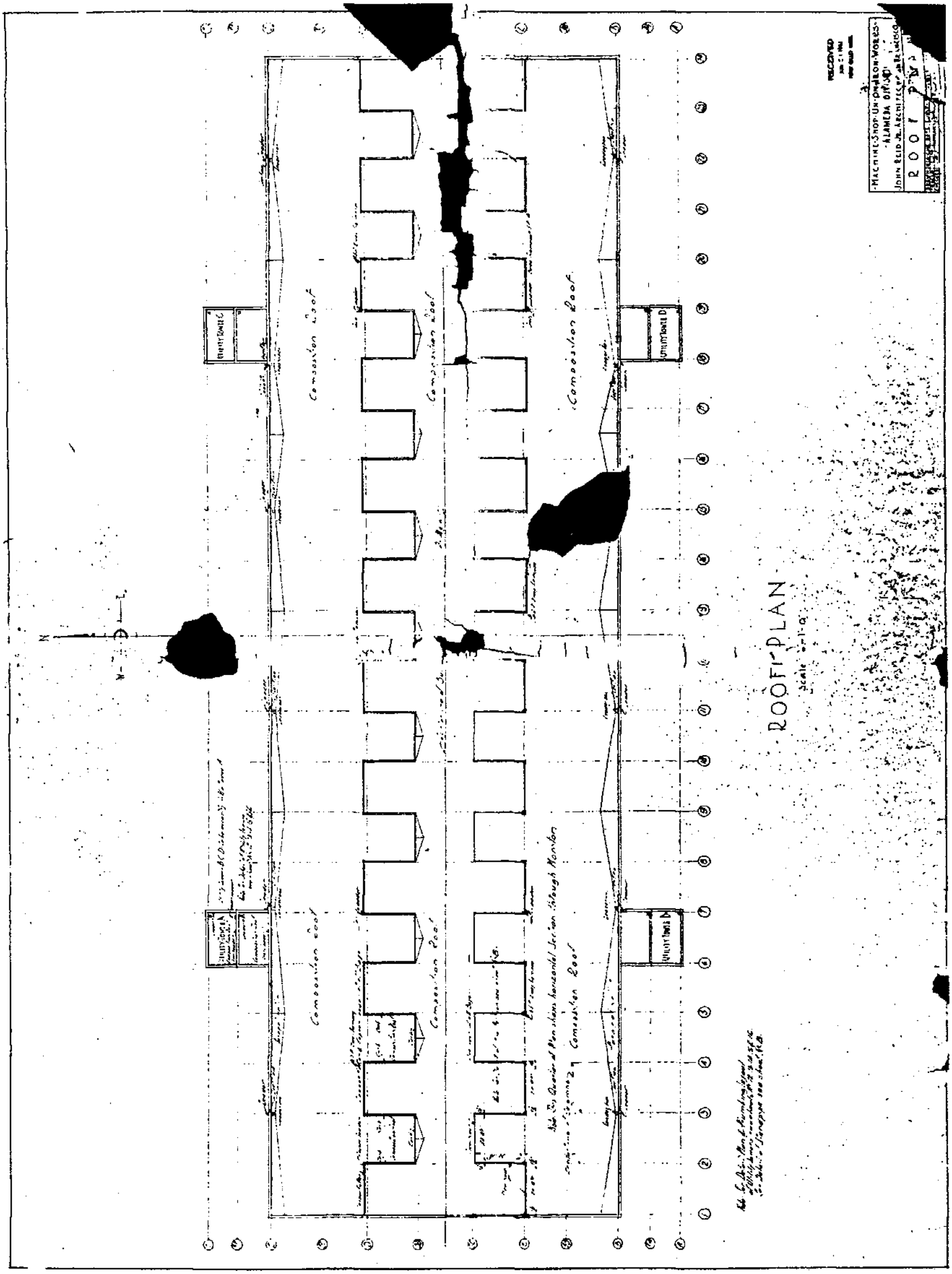





Typical Floor Slab Reinforcing for Side Bays
between Col's on Lines B&C and Lines D&E
Typical Floor Slab Reinforcing for Central Bays
between Col's on Lines C&D
Cross Section of Square Concrete Pile-Cap
Cross Section of Circular Concrete Pile-Cap
Detail of Anchor Bolts for Face Plates
Detail of Anchor Bolts for Columns on Lines B, C, D & E
Plan showing Location of Anchor Bolts in Face Plates No. 3
Plan showing Location of Anchor Bolts in Face Plates No. 1
Plan showing Location of Anchor Bolts in Face Plate No. 2
Machine Shop Union Iron Works


MACHINE SHOP-UNION IRON WORKS
ALAMEDA DIVISION
JOHN BAKEWELL ARCHITECT-SAN FRANCISCO
FIRST FLOOR PLAN
FIRST FLOOR PLAN
LEGEND


BALCONY
BALCONY
BALCONY
BALCONY
BALCONY
BALCONY
BALCONY PLAN
DETAIL OF HATCH WAY - OMIT
PLAN
SECTION B-B
SECTION A-A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Composition Roof
Composition Roof
Composition Roof
Composition Roof
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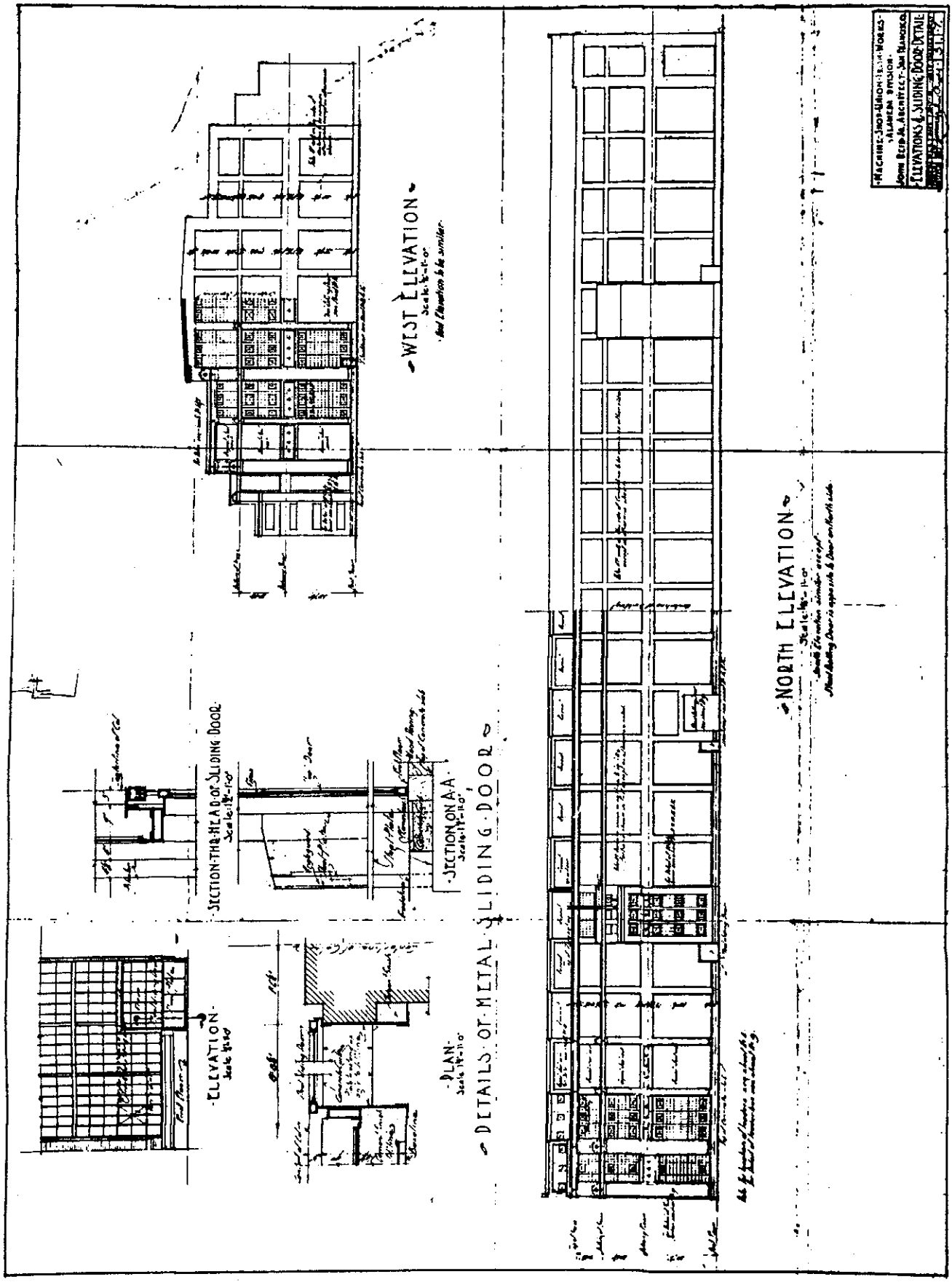
Composition Roof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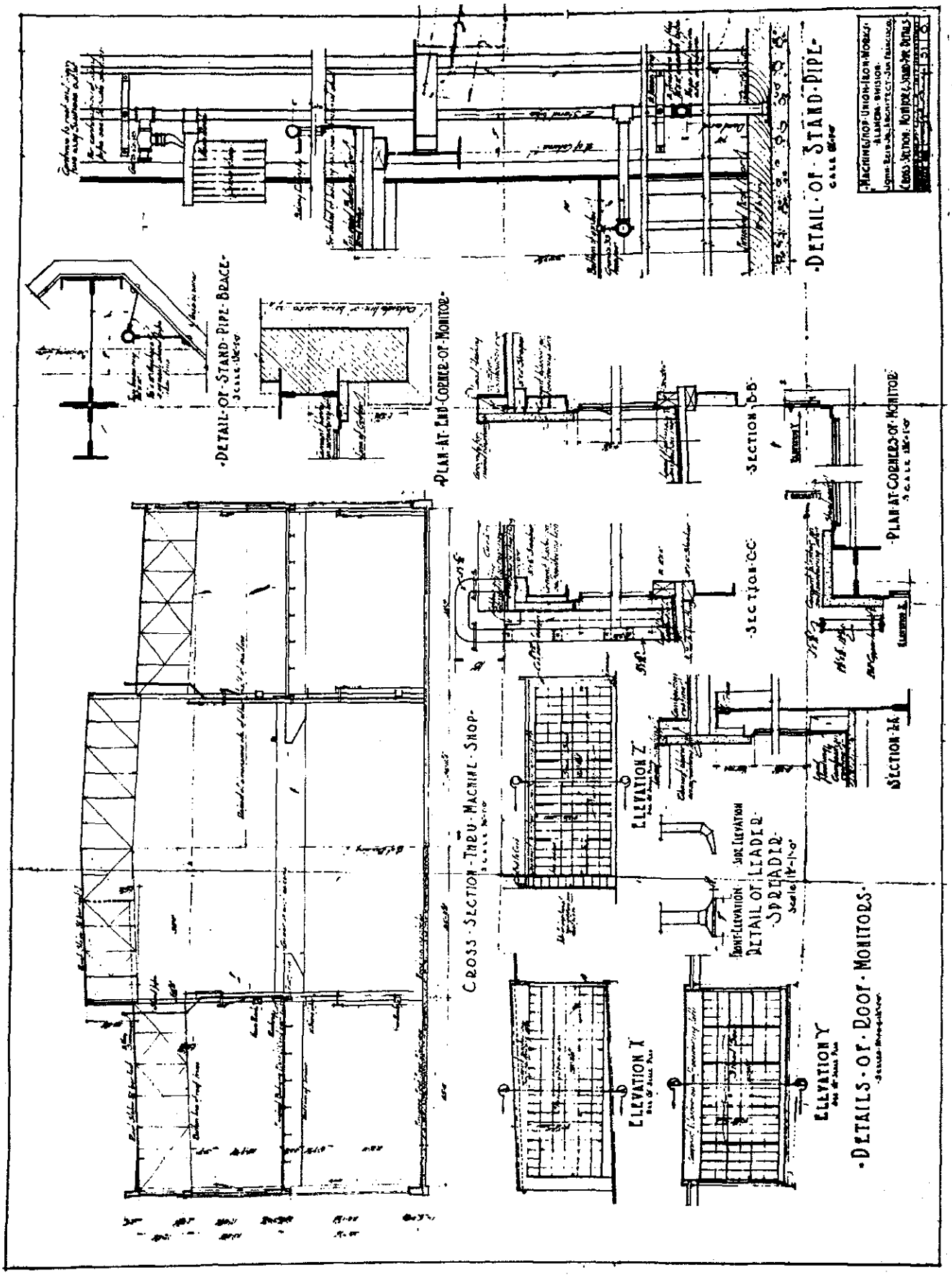
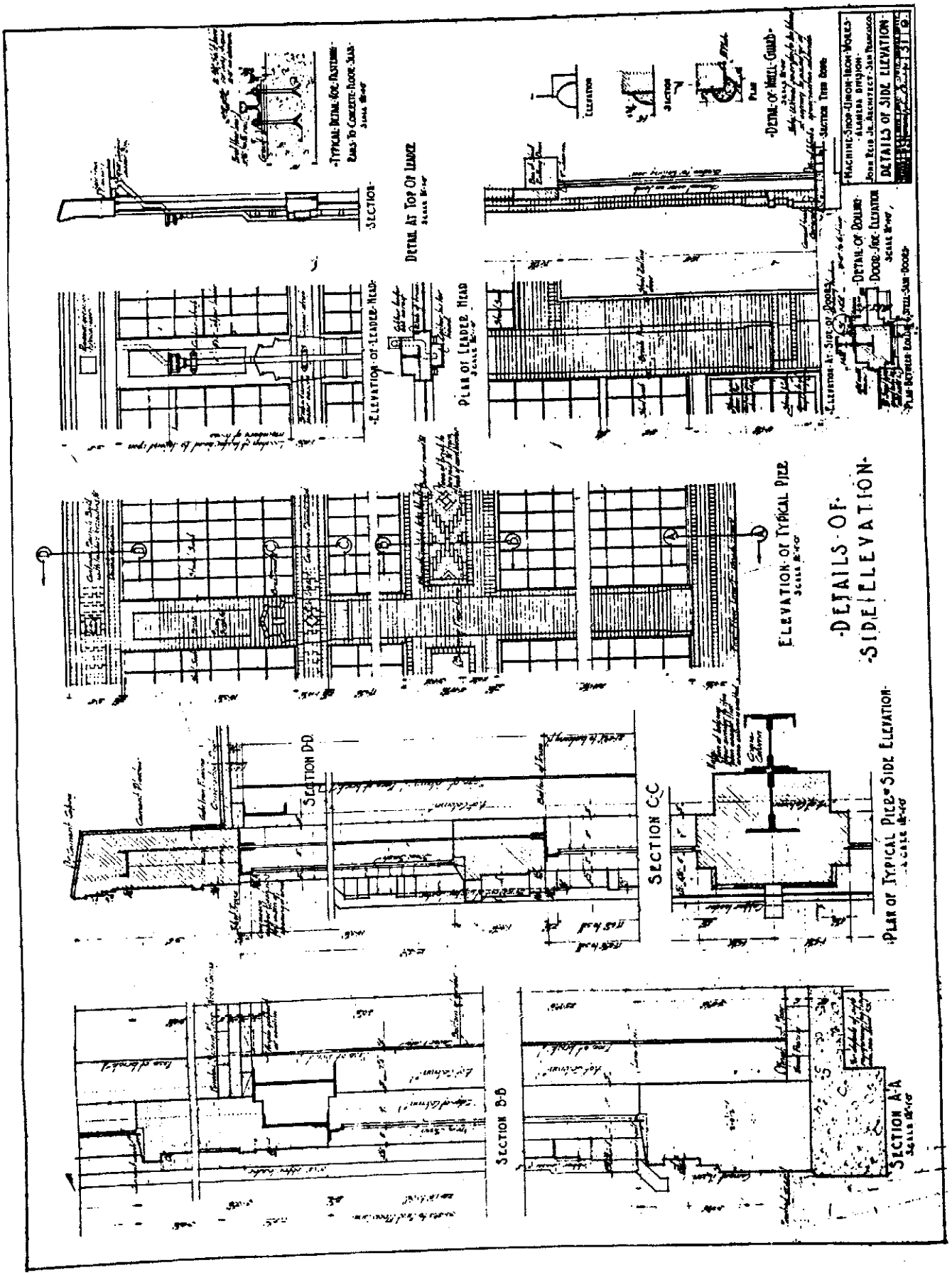
NORTH ELEVATION
DETAILS OF METAL SLIDING DOOR
SECTION THRU HEAD OF SLIDING DOOR
SECTION ON A-A
ELEVATION
PLAN


DETAIL OF STAND PIPE
DETAIL OF STAND-PIPE BRACE
PLAN AT END CORNER OF MONITOR
SECTION B-B
PLAN AT CORNER OF MONITOR
SECTION C-C
SECTION A-A
CROSS SECTION THRU MACHINE SHOP
ELEVATION Z
DETAIL OF LEADER SPREADER
ELEVATION X
ELEVATION Y
DETAILS OF ROOF MONITORS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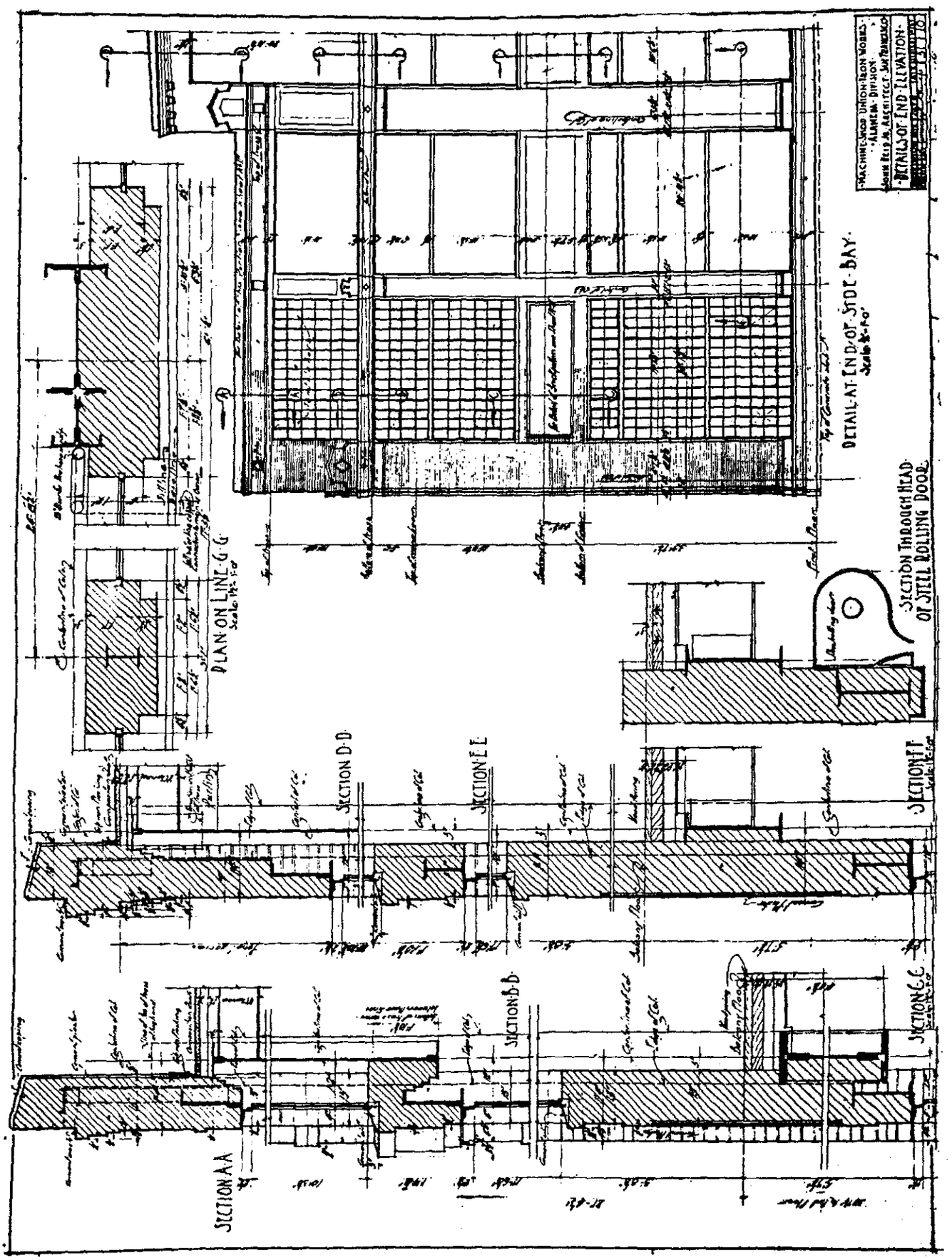
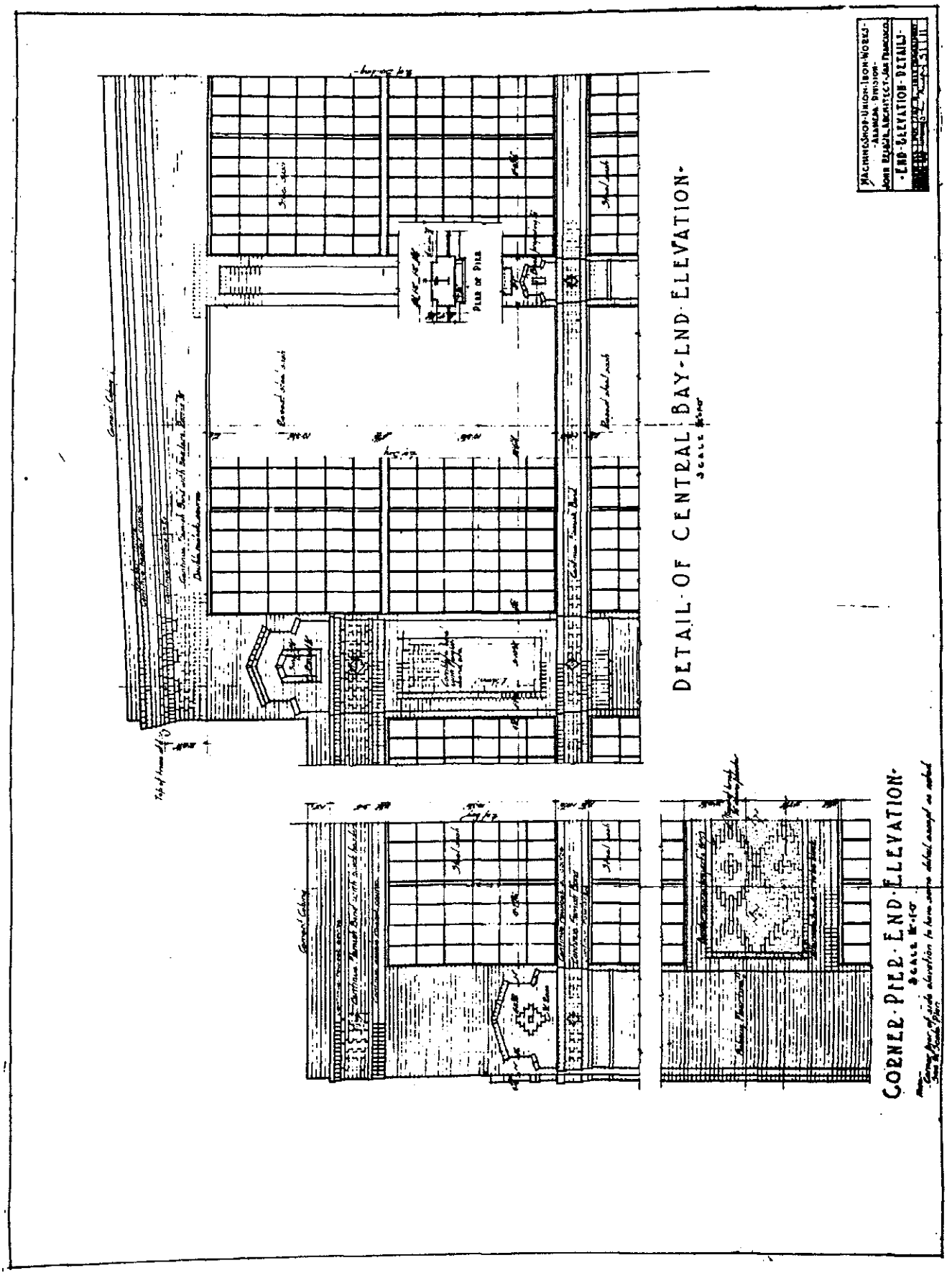
DETAIL AT TOP OF LEADER
PLAN OF LEADER HEAD
ELEVATION OF TYPICAL PIER
DETAILS OF SIDE ELEVATION
SECTION D-D
SECTION C-C
PLAN OF TYPICAL PIER & SIDE ELEVATION
SECTION B-B
SECTION A-A


MACHINE SHOP UNION IRON WORKS
ALAMEDA DIVISION
JOHN REID JR. ARCHITECT SAN FRANCISCO
DETAILS OF END ELEVATION
DETAIL AT END OF SIDE BAY
PLAN ON LINE G-G
SECTION THROUGH HEAD OF STEEL ROLLING DOOR
SECTION D-D
SECTION E-E
SECTION F-F
SECTION A-A
SECTION B-B
SECTION C-C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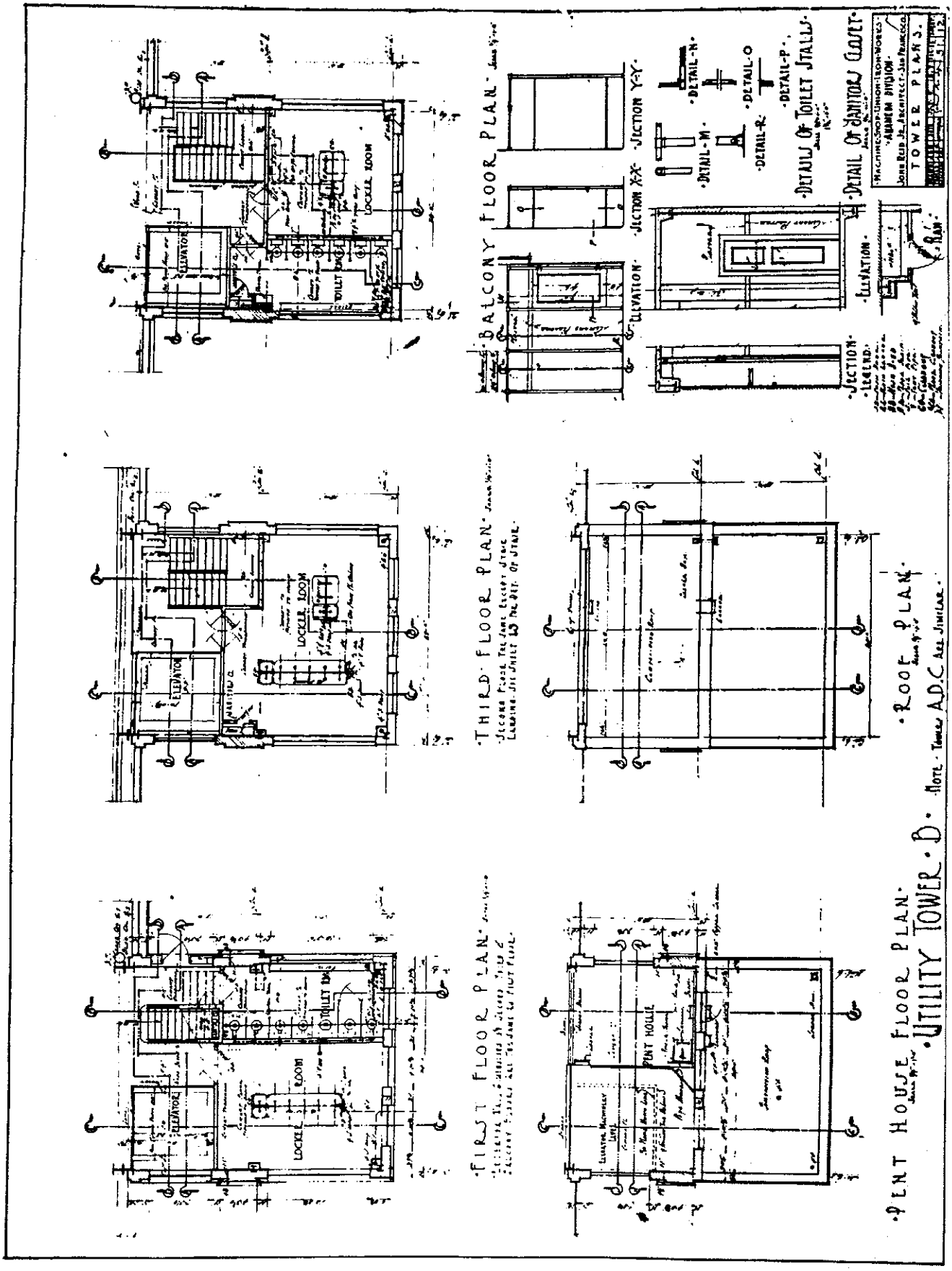
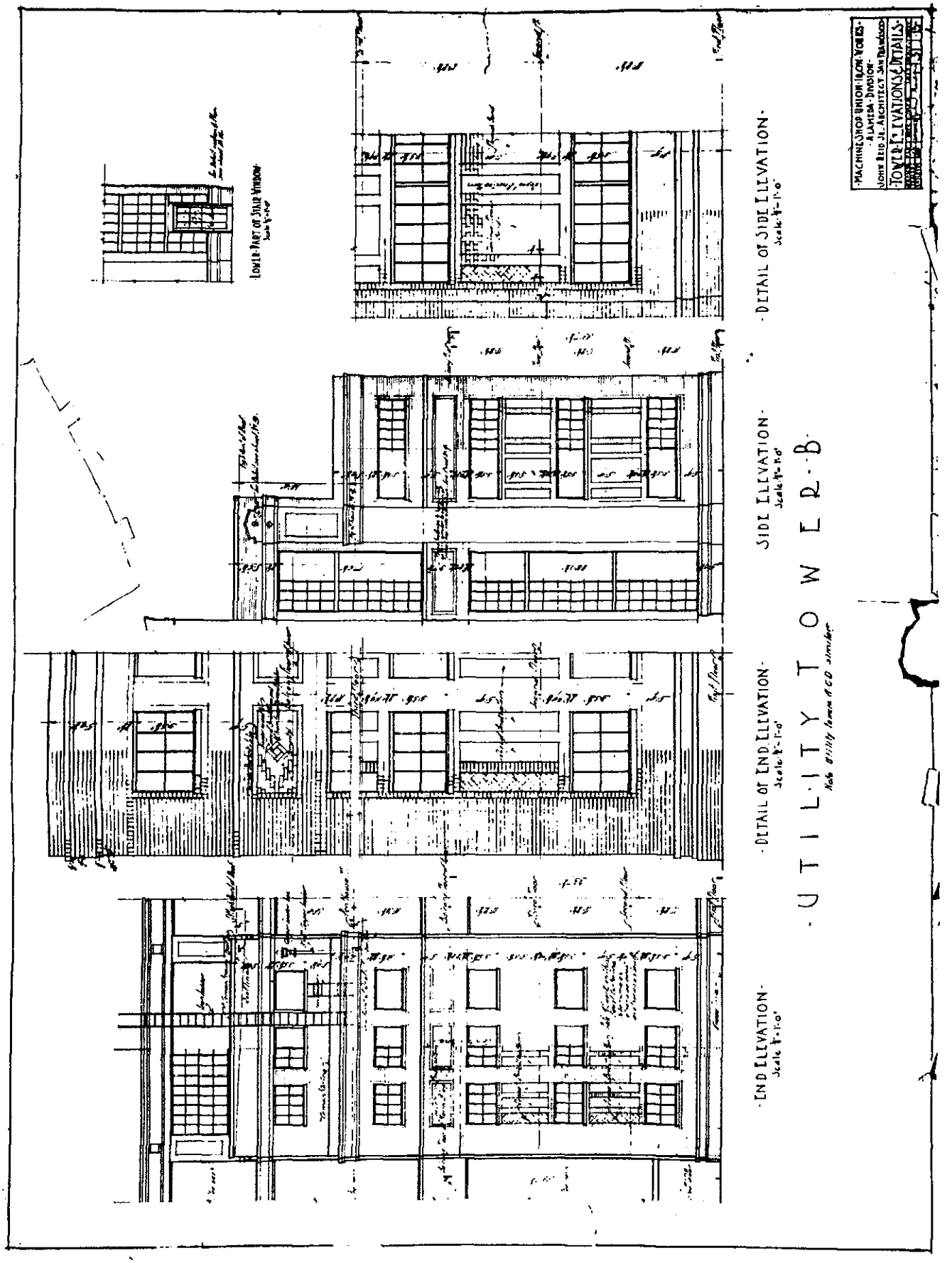
CORNER PIER END ELEVATION


PENT HOUSE FLOOR PLAN.
UTILITY TOWER - D.
ROOF PLAN.
THIRD FLOOR PLAN.
FIRST FLOOR PLAN.
BALCONY FLOOR PLAN.
DETAIL OF JANITORS CLOSET.
DETAILS OF TOILET STALLS.
TOWER PLANS.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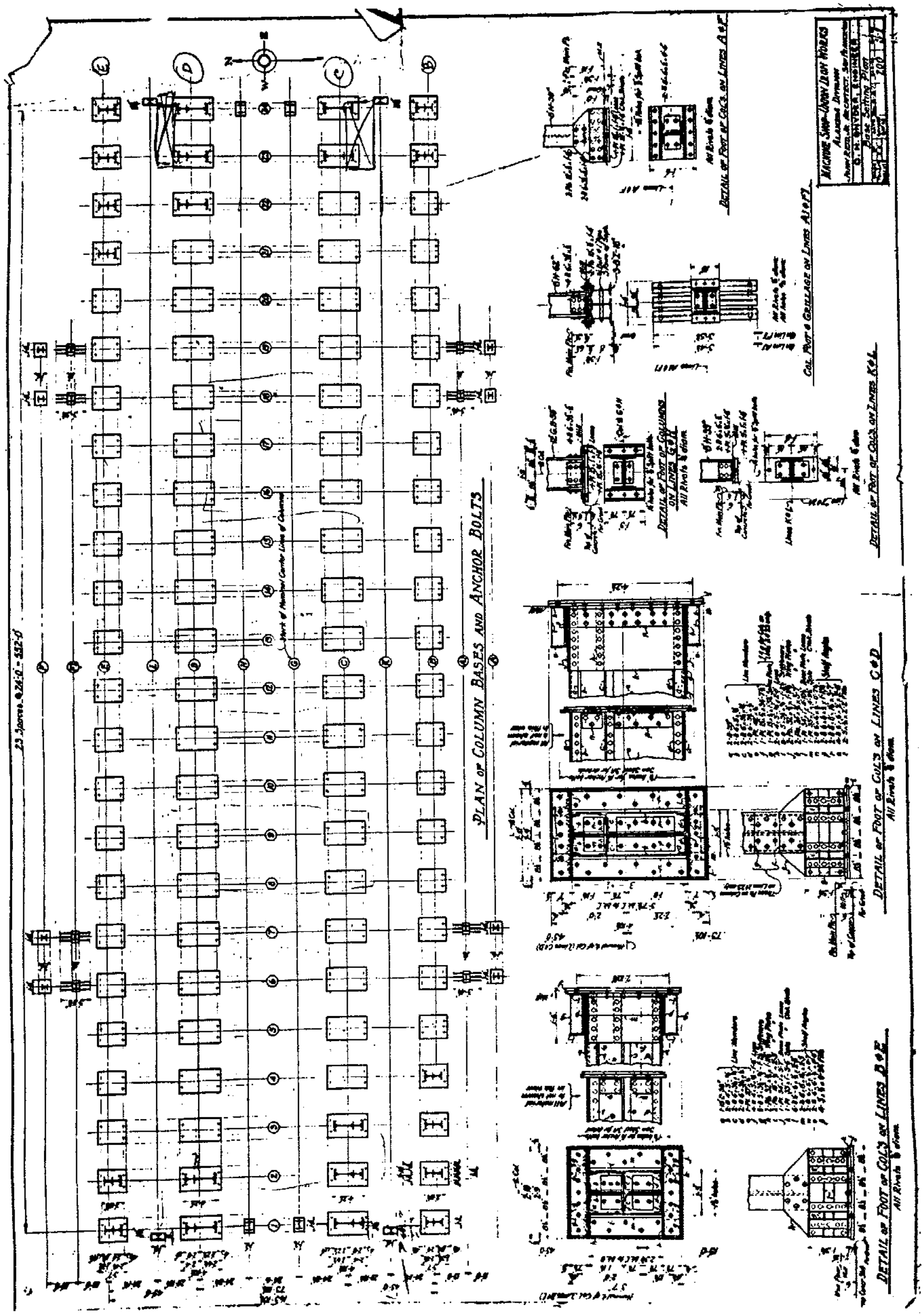
ALAMEDA DIVISION
JOHN REID JR. ARCHITECT SAN FRANCISCO
TOWER ELEVATIONS & DETAILS
LOWER PART OF SIDE ELEVATION
DETAIL OF SIDE ELEVATION
SIDE ELEVATION
DETAIL OF END ELEVATION
END ELEVATION
UTILITY TOWER B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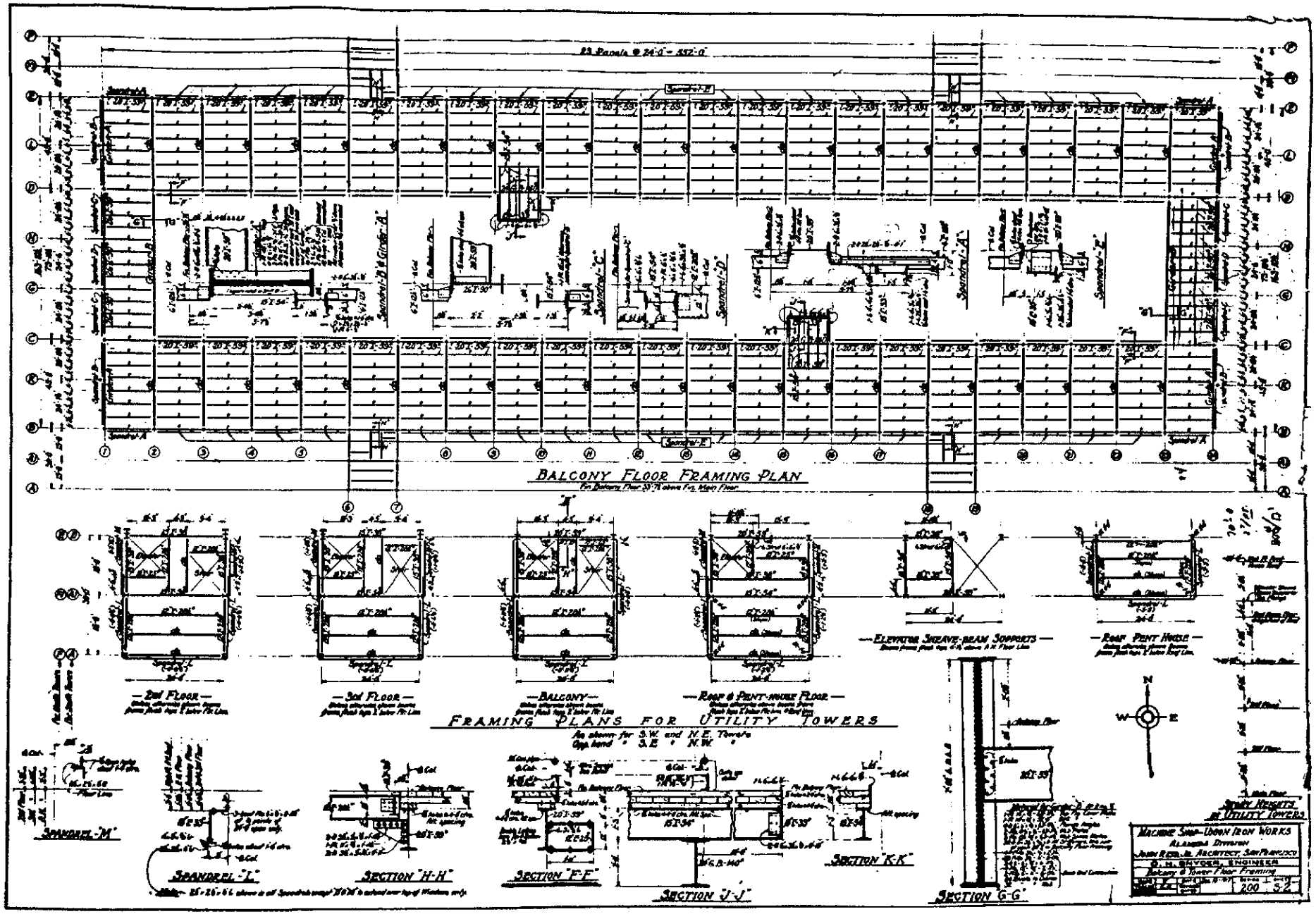
COL. FOOT & GRILLAGE ON LINES A1 & F1
DETAIL OF FOOT OF COLUMNS ON LINES G & H
DETAIL OF FOOT OF COL'S ON LINES K & L
DETAIL OF FOOT OF COL'S ON LINES C & D
DETAIL OF FOOT OF COL'S ON LINES B & E
MACHINE SHOP—UNION IRON WORKS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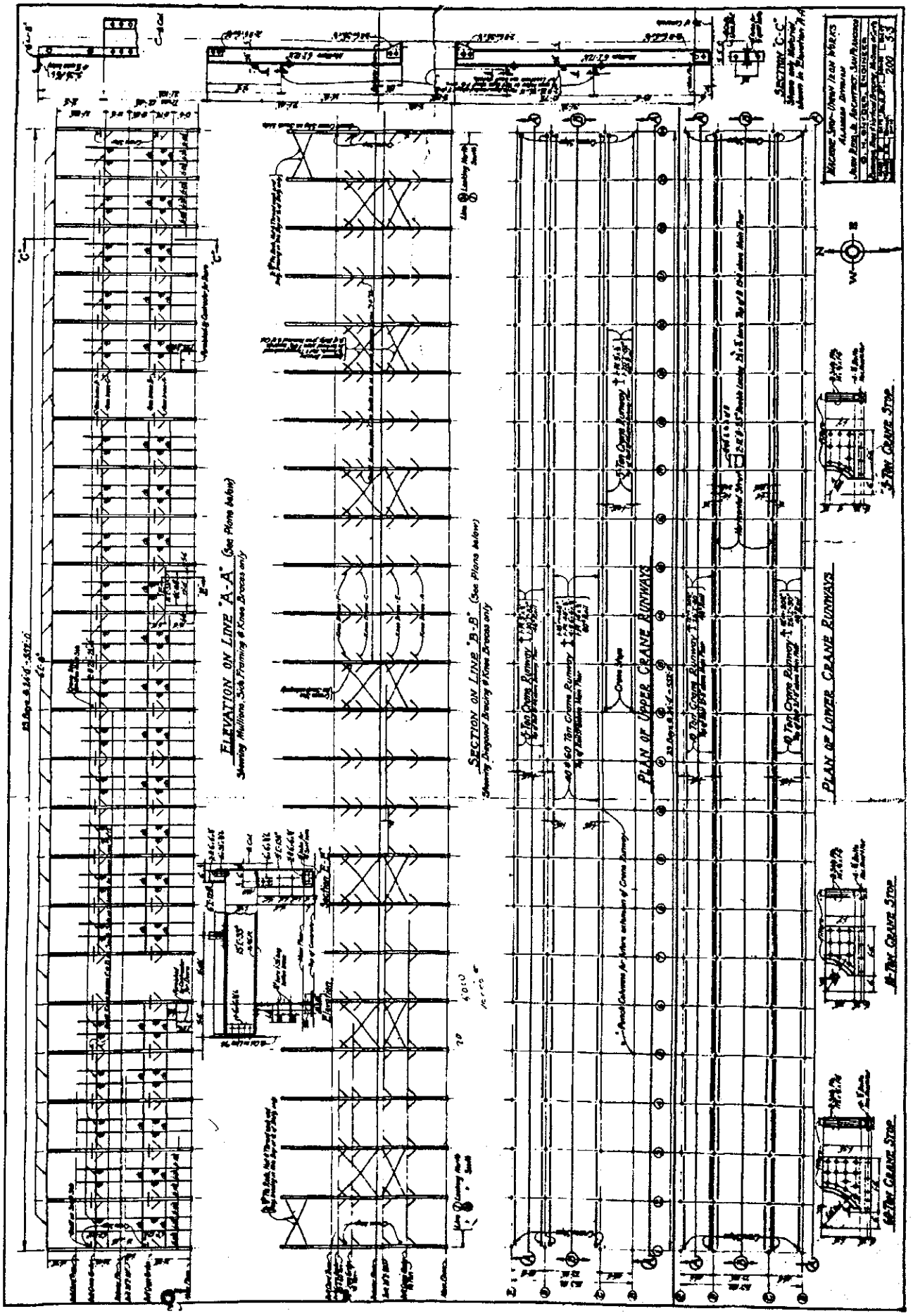
FRAMING PLANS FOR UTILITY TOWERS
SPANDREL "M"
SPANDREL "L"
SECTION "H-H"
SECTION "F-F"
SECTION "J-J"
SECTION "K-K"
SECTION "G-G"
ELEVATOR SHEAVE BEAM SUPPORTS
ROOF PENT HOUSE
UNION IRON WORKS
HAER No. CA-43 (Page 23)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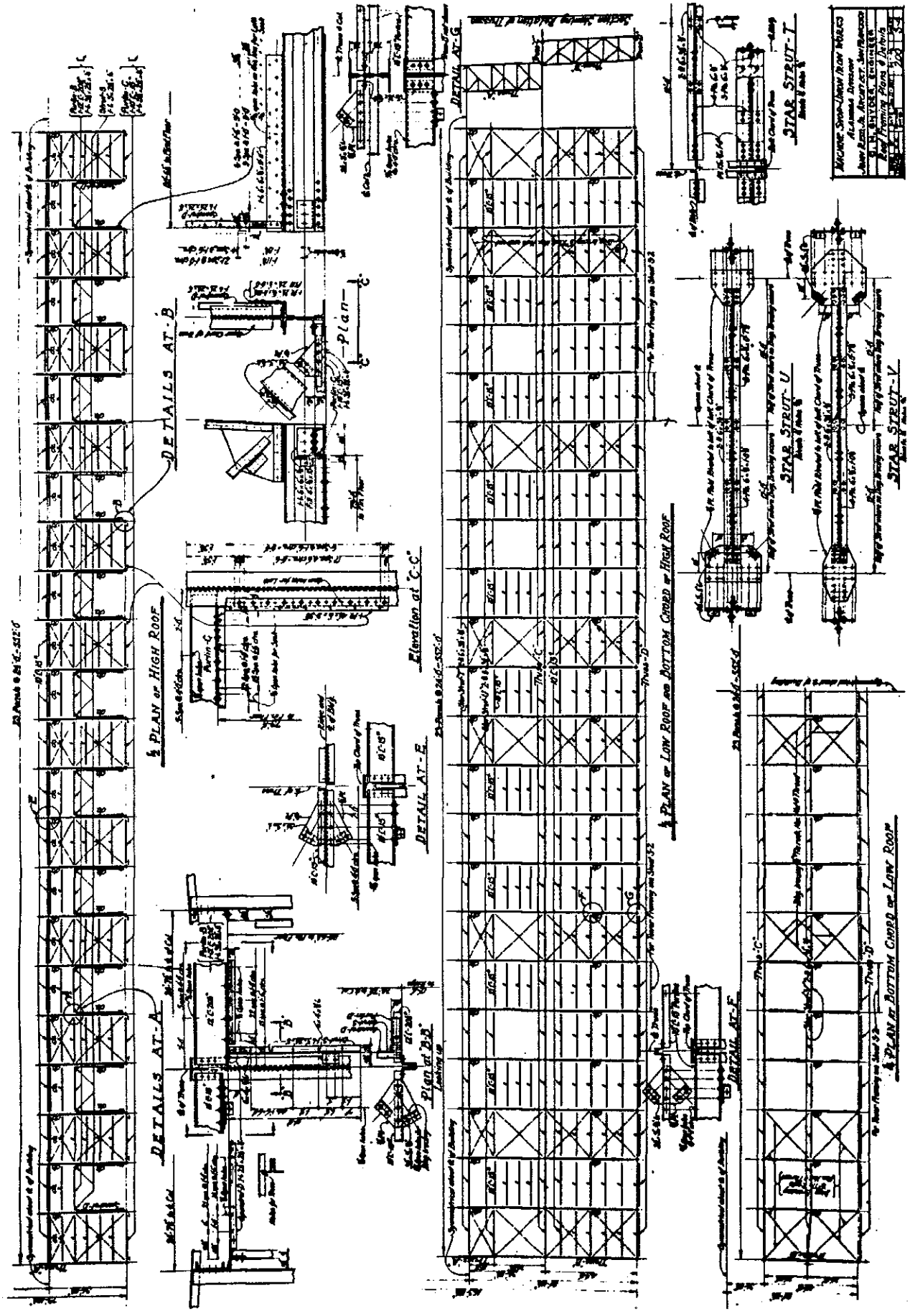
Showing Mullions, Side Framing & Knee Braces only
SECTION ON LINE "B-B" (See Plans below)
Showing Purlins, Bracing & Knee Braces only
PLAN OF UPPER CRANE RUNWAYS
PLAN OF LOWER CRANE RUNWAYS
SECTION "C-C"
5 Ton Crane Stop
16 Ton Crane Stop
40 Ton Crane Stop
N
W
E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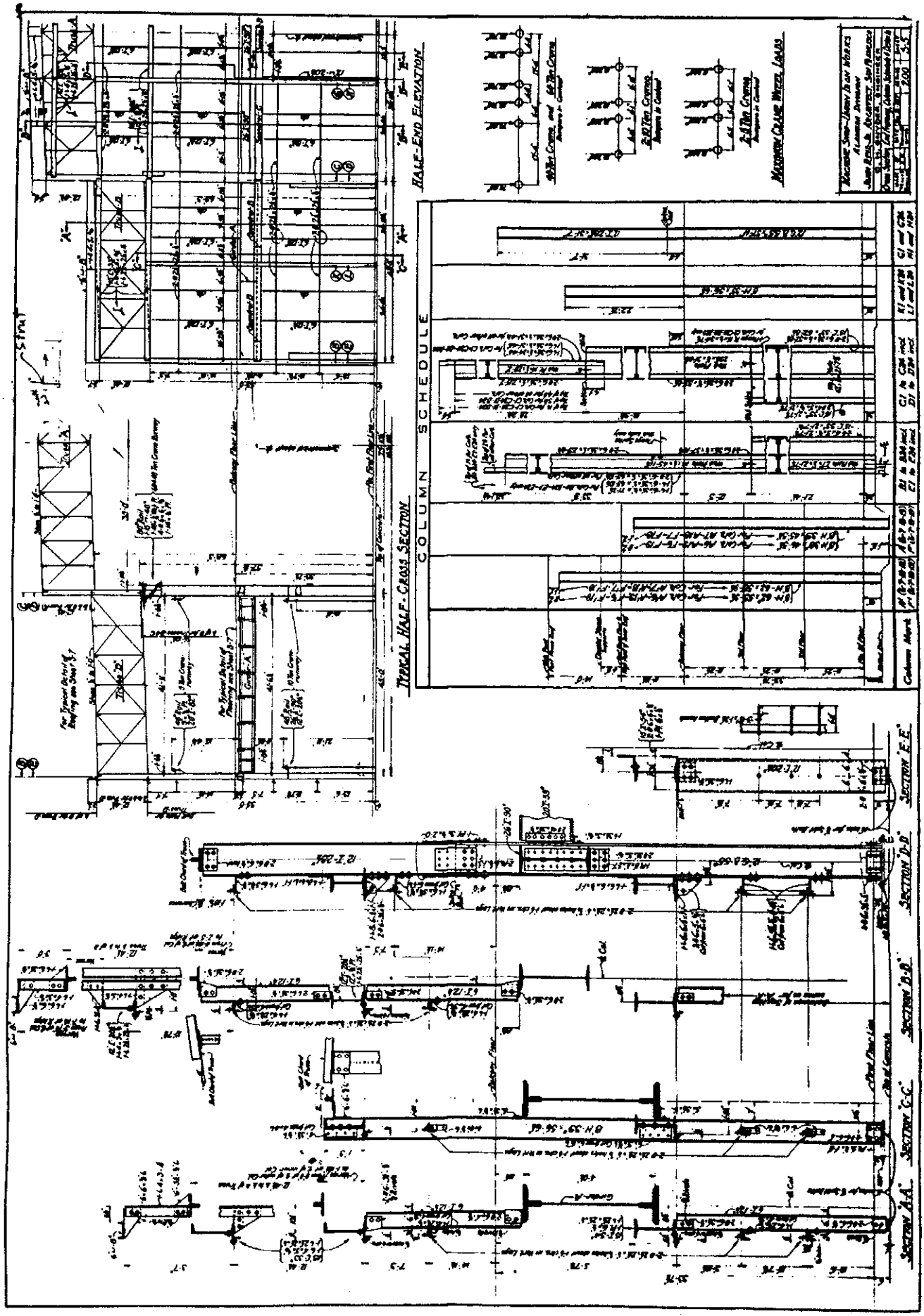
DETAILS AT-A
DETAILS AT-B
Plan
Elevation at 'C-C'
DETAIL AT-E
Plan at 'B-B'
DETAIL AT-G
½ PLAN at LOW ROOF and BOTTOM CHORD at HIGH ROOF
STAR STRUT-T
STAR STRUT-U
STAR STRUT-V
DETAIL AT-F
½ PLAN at BOTTOM CHORD at LOW ROOF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TYPICAL HALF-CROSS SECTION
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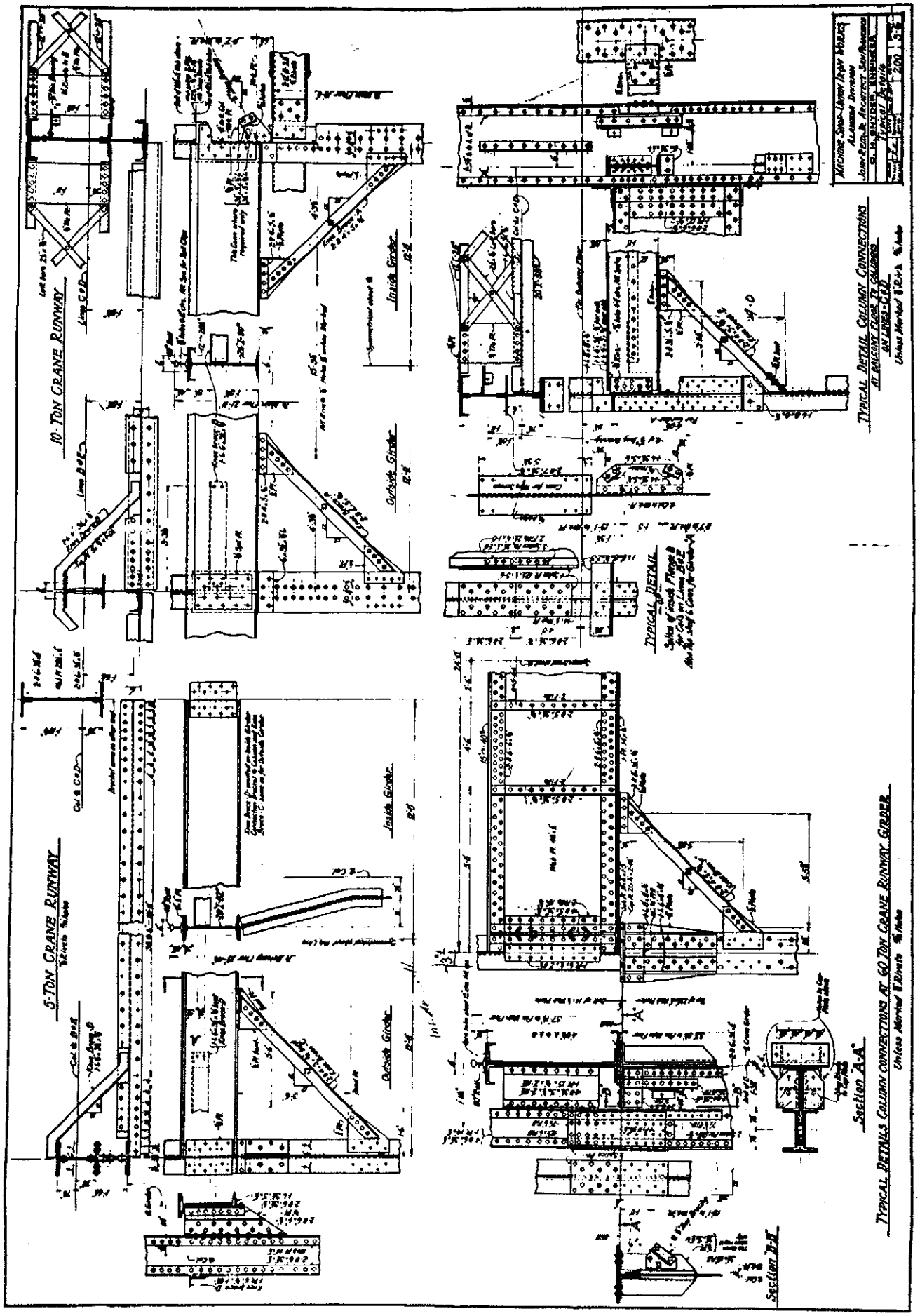
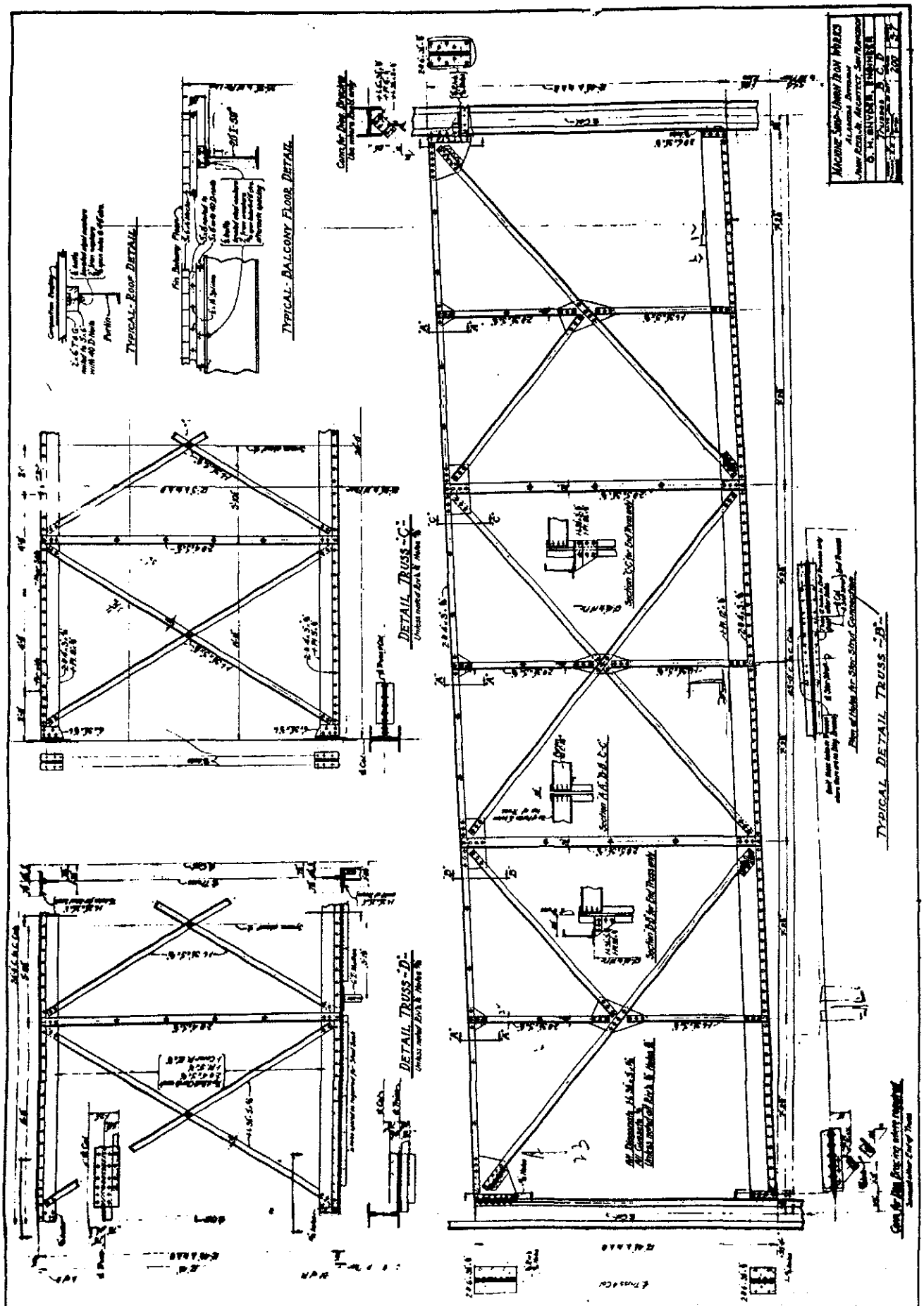
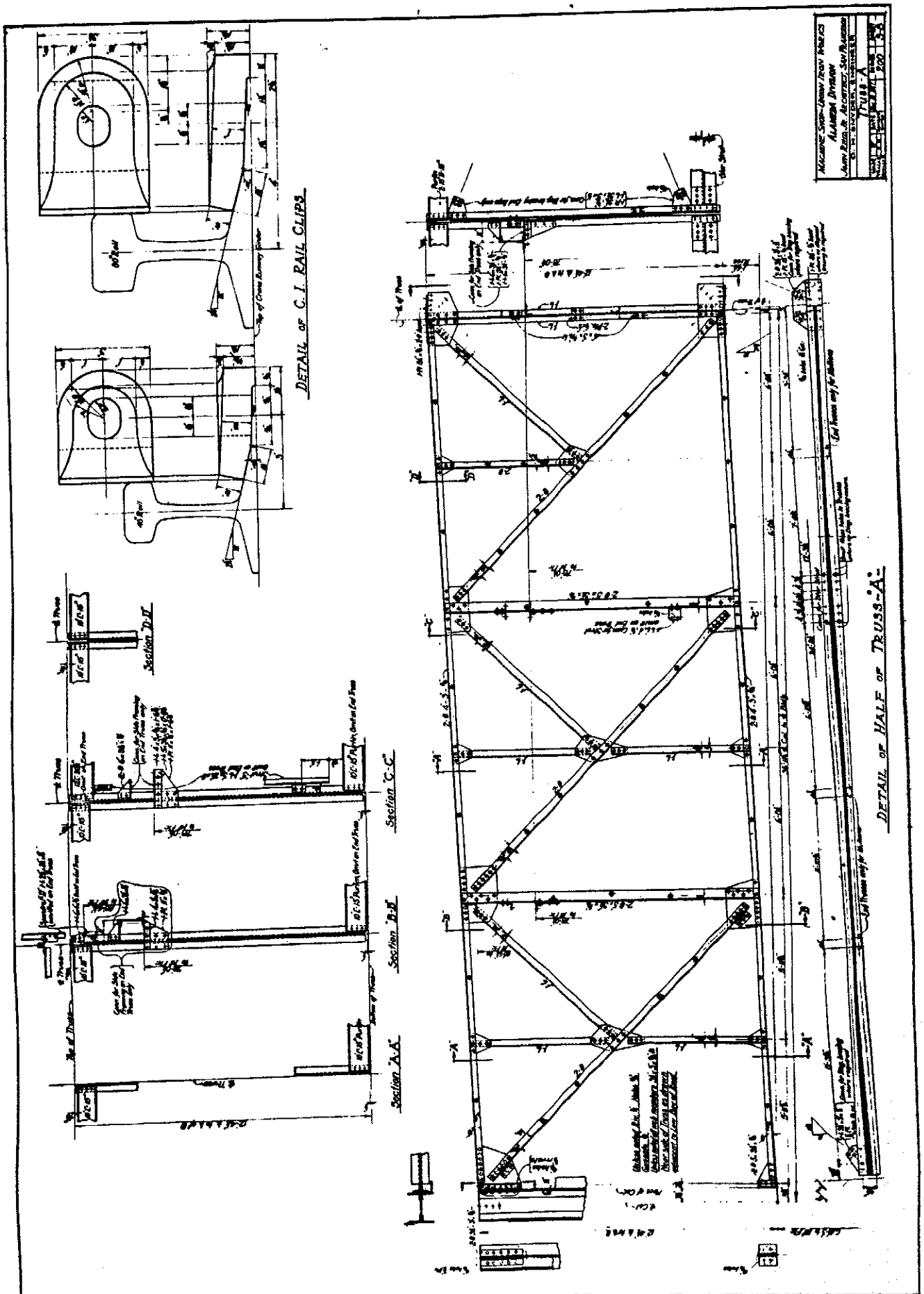
SECTION 'D-D'
SECTION 'B-B'
SECTION 'C-C'
SECTION 'A-A'


10-Ton Crane Runway
5-Ton Crane Runway
Inside Girder
Outside Girder
Typical Detail Column Connections at Balcony Floor to Girders
Typical Detail
Typical Details Column Connections at 60 Ton Crane Runway Girder
Section A-A
Section B-B


TYPICAL - ROOF DETAIL
TYPICAL - BALCONY FLOOR DETAIL
DETAIL TRUSS -C-
DETAIL TRUSS -D-
TYPICAL DETAIL TRUSS -B-


DETAIL OF C.I. RAIL CLIPS
Section 'D-E'
Section 'C-C'
Section 'B-B'
Section 'A-A'
DETAIL OF HALF OF TRUSS 'A'